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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/023,940	12/21/2001	Jin-goo Park	1751-297	7717

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EXAMINER

KORNAKOV, MICHAIL

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 04/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/023,940

Applicant(s)

PARK ET AL.

Examiner

Michael Kornakov

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 3 and 4 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 3 and 4 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of claims 3 and 4 in Paper dated 03/17/2004 is acknowledged. Claims 1 and 2 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Claims 3 and 4 are examined on the merits.

Specification

2. The disclosure is objected to because of the following informalities: page 6, line 25 recites "An ammonium hydroxide tank 4", however page 7, line 4 recites "The ozone generator 4". Therefore, the same reference number is used to designate different parts. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 3 and 4 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claims 3 and 4 recite "aqueous ammonium hydroxide, which is composed of

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ammonium hydroxide and deionized water in the **volume** ratio of 0.001-0.01 : 5".

However, the nature of ammonium hydroxide is not provided by the instant claims or disclosure. The instant disclosure does not indicate whether ammonium hydroxide is taken in solid form or been dissolved and what concentration of that solution may be.

Thus, one skilled in the art will not be able to remove contaminants on the wafer surface utilizing a cleaning solution as instantly recited and therefore make or use the claimed invention without undue experimentation.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 3 and 4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The recited in claims 3 and 4 "aqueous ammonium hydroxide, which is composed of ammonium hydroxide and deionized water in the **volume** ratio of 0.001-0.01 : 5" constitutes an indefinite subject matter, because it is not clear whether ammonium hydroxide was taken in solid form or in solution. Therefore, it is not clear how to obtain the required volume ratio.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

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the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining

obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

8. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

9. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukazawa (U.S. 6,423,146).

Fukazawa teaches a method for cleaning a surface of semiconductor substrate

by forming a cleaning solution from ozone and ammonium hydroxide, supplying the said cleaning solution to processing chamber and processing the surface of semiconductor substrate with said cleaning solution, wherein the processing is enhanced by applying ultrasonic waves to the said surface (Abstract; col. 2, lines 5-10; col.3, lines 25-35, 42-

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50; col.6, lines 48-56). With regard to the limitation, specifying "a room temperature", it is noticed here, that the cleaning temperature is result effective parameter, because it affects the concentration of ozone in cleaning solution, thus affecting the processing time and/or the roughness of the treated surface. However, discovery of optimum value of result effective variable in known process is ordinarily within the skill in the art and would have been obvious, consult *In re* Boesch and Slaney 205 USPQ 215 (CCPA 1980). With regard to the limitation, reciting "supplying the cleaning solution into a cleaning bath through a filter for removing ozone bubble", it is noticed here that such degasifying filters or membranes are conventionally utilized in the art wherein ultrasonic cleaning is involved in order to maintain efficient cavitations established by ultrasonic devices and therefore one skilled in the art would have found it obvious to utilize such filter in order to provide efficient ultrasonic treatment in the method of Fukazawa with the reasonable expectation of success.

10. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukazawa in view of JP2000-164552.

The teaching of Fukazawa remains silent about supplying the cleaning solution into the processing chamber through a chiller. However, Fukazawa indicates the necessity of increasing the concentration of ozone in cleaning solution (col.3, lines 15-19). JP'552 teaches processing of semiconductor substrates and indicates that in order to increase ozone concentration in cleaning media such media should be cooled at 15°C or below (Abstract). Therefore, one skilled in the art motivated by teaching of Fukazawa would have found it obvious to supply the cleaning solution through the

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chiller in order to maintain the required ozone concentrations in the cleaning solution of Fukazawa.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (571) 272-1303. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy Gulakowski can be reached on (571) 272-1302. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

M. Kornakov

Michael Kornakov
Examiner
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4/17/2004

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